

CLAIMS

1. A method for automatic operation of a vehicle, said vehicle comprising a vehicle engine, a starter motor linked to said vehicle engine through an engine clutch and a plurality of vehicle systems linked to said starter motor, said method comprising the steps of:

detecting whether said engine is running;

ascertaining that the status of one or more of said vehicle systems are proper for shutting down said vehicle engine;

applying a negative torque to said vehicle engine to stop the running of said vehicle engine by connecting said vehicle engine to said starter motor through said engine clutch;

checking the status of one or more of said vehicle systems to determine whether said vehicle engine should be restarted;

restarting said vehicle engine by connecting said vehicle engine to said starter motor through said engine clutch; and

confirming said vehicle engine has successfully started.

2. The method of claim 1, further comprising the step of:

evaluating whether the ambient conditions surrounding said vehicle are conducive to operation prior to said step of applying a negative torque to said vehicle engine.

3. The method of claim 1, wherein the negative torque applied to the vehicle engine is high enough to cause a rapid deceleration through the harmonic resonance point of said vehicle.

4. The method of claim 1, wherein said vehicle further comprises a multi-position ignition switch linked to said starter motor, and a throttle, a transmission, and a brake system, said throttle, transmission and brake system connected to said starter motor through a transmission clutch.

5. The method of claim 4, wherein said vehicle systems further comprise at least one member of the following group:

the velocity of said vehicle;

the brakes of said vehicle;
the gear position of said vehicle;
the engine clutch of said vehicle;
the transmission clutch of said vehicle;
the multi-position ignition switch of said vehicle;
the vehicle engine of said vehicle; and
the throttle of said vehicle.

6. The method of claim 2, wherein said ambient conditions further comprise at least the temperature of the air outside the vehicle and the humidity of the air outside the vehicle.

7. The method of claim 1, wherein the step of checking the status of one or more of said vehicle systems to determine whether said vehicle engine should be restarted further comprises the steps of:

evaluating vehicle systems directly controlled by the vehicle operator for a signal from the vehicle operator for a restart of said engine; and

assessing whether the vehicle systems status require that the vehicle be restarted.

8. The method of claim 7, said signals from the vehicle operator comprising at least one member of the following group:

varying the pressure on said brake system; and
opening said throttle.

9. The method of claim 7, said vehicle systems further comprising a battery and a hood linked to said starter motor, said step of assessing whether the vehicle systems status require that the vehicle be restarted further comprising assessment of at least one member of the following group:

said vehicle engine's length of time of inactivity;
said vehicle engine's internal temperature;
said battery's state of charge; and
said hood's physical position.

10. The method of claim 1, said step of confirming said vehicle engine has successfully started further comprising the steps of:

detecting whether said vehicle engine is cranking without starting; and
verifying that said vehicle engine has not stalled.

11. The method of claim 10, said step of detecting whether said vehicle engine is cranking without starting further comprising the steps of:

measuring the length of time said vehicle engine has cranked without starting;

sensing said the state of charge of said battery; and

engaging an emergency mode if either said length of time is too long or said state of charge is too low.

12. The method of claim 11, said emergency mode comprising the following steps:

disengaging said engine clutch; and

providing minimal power from the starter motor to the vehicle systems to run the vehicle.

13. The method of claim 10, wherein, if it is found that the vehicle engine is stalled, the starter motor is shut down.

14. A method for starting a vehicle, said vehicle comprising a vehicle engine, a starter motor linked to said vehicle engine through an engine clutch, and a plurality of vehicle systems linked to said starter motor, said method comprising the steps of:

starting said starter motor;

checking the status of one or more of said vehicle systems to determine whether said vehicle engine should be started;

applying a torque to said vehicle engine by connecting said vehicle engine with said starter motor through said engine clutch; and

confirming whether said vehicle engine has successfully started.

15. The method of claim 14, further comprising the steps of:

providing a multi-position ignition switch linked to said starter motor;

recognizing the initial status of one or more of said vehicle systems required to start said vehicle engine; and

detecting whether said multi-position ignition switch is in a pre-determined position.

16. The method of claim 14, further comprising the steps of:
providing a multi-position ignition switch linked to said starter motor;
recognizing the initial status of one or more of said vehicle systems required to start said vehicle engine;

detecting whether said multi-position ignition switch is not positioned in a pre-determined position for a set length of time; and

shutting down the starter motor.

17. The method of claim 14, wherein said vehicle further comprises a set of gears linked to said starter motor through a transmission clutch, said initial status of one or more of said vehicle systems required to start said vehicle engine comprising at least one member of the following group:

the engagement of said set of gears;

the engagement of said transmission clutch;

the engagement of said engine clutch; and

the operation of said vehicle.

18. The method of claim 14, wherein said step of checking the status of one or more engine systems further comprises the steps of:

evaluating the amount of time said vehicle engine has idled without a start attempt; and

detecting whether said multi-position ignition switch is in a pre-determined position.

19. The method of claim 18, further comprising the step of shutting down said starter motor if the amount of time said vehicle engine has idled reaches a predetermined length.

20. The method of claim 14, wherein said step of confirming whether said vehicle engine has successfully started further comprises the steps of:

evaluating whether the current angular velocity of said vehicle engine is greater than that of the vehicle engine while idle;

evaluating the time said vehicle engine has been cranking without starting, if said vehicle engine's speed is less than idle speed; and

shutting down said starter motor if said time of cranking is greater than a pre-determined length of time.